

Claims

1. A process for the preparation of polyacrylamide beads containing encapsulated cells comprising the steps of
 - (i) providing an aqueous solution of a mixture of acrylic monomers,
 - (ii) providing a suspension of cells in an aqueous solution of a persulfate
 - (iii) providing an emulsion of an aqueous solution of a tertiary amine in an water-immiscible liquid, which liquid optionally contains a surfactant,
 - (iv) mixing the solution provided in step (i) and the suspension provided in step (ii)
 - (v) adding the mixture obtained in step (iv) to the stirred emulsion provided in step (iii)
 - (vi) polymerizing the mixture of acrylic monomers and simultaneously encapsulating the cells to form polyacrylamide beads containing encapsulated cells.
2. The process of claim 1 wherein the polyacrylamide beads have a size of 0.05 to 3 mm and a mechanical strength of at least 200 mN.
3. The process of claim 2 wherein the polyacrylamide beads have a size of 0.1 to 1.5 mm and a mechanical strength of at least 300 mN.
4. The process of any of claims 1 to 3, wherein the ratio of dry cells/mixture of acrylic monomers is 0.001:1 to 1:1 (w/w).
5. The process of any of claims 1 to 4, wherein the ratio of dry cells/mixture of acrylic monomers is 0.2:1 to 0.9:1 (w/w).
6. The process of any of claims 1 to 5 wherein the cell is a bacterial cell.
7. The process of claim 6 wherein the cell is a cell of a bacterium of the group nocardioform Actinomycetes or of the family Enterobacteriaceae.

8. The process of any of claims 1 to 7 wherein the tertiary amine is *N,N,N',N'*-tetramethylethylenediamine or 3-(dimethylamino)propionitrile.
9. The process of any of claims 1 to 8 wherein the water-immiscible liquid is a mineral oil.
10. The process of any of claims 1 to 9 wherein no surfactant is used.
11. The process of any of claims 1 to 10 wherein the polyacrylamide beads formed in step (vi) are separated.
12. Polyacrylamide beads containing encapsulated cells obtainable by a process of any of claims 1 to 11.
13. The polyacrylamide beads of claim 12 wherein the encapsulated cells are cells of a strain of the genus *Rhodococcus* containing a nitrile hydratase.
15. The use of the polyacrylamide beads of claims 12 or 13 as a biocatalyst for the transformation of a substrate to a product.
16. The use of claim 15 wherein the substrate is a nitrile and the product is the corresponding amide.
17. The use of claim 16 wherein the nitrile is 3-cyanopyridine and the product is nicotinamide.